
The Conservation Status of the White-throated Grasswren *Amytornis woodwardi*, an example of problems in Status Designation

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Abstract

The conservation status of the White-throated Grasswren has recently been designated secure, mostly on the basis of a recent survey which estimated its total population as about 50,000 to 60,000. This estimate is amended here to less than 10,000, and the process of changed fire regime may provide a substantial and continuing negative influence on this population. This case illustrates some more pervasive features complicating the designation of conservation status.

Introduction

Until a recent survey by Noske (1988), very little was known of the biology, distribution or population size of the White-throated Grasswren *Amytornis woodwardi* (Schodde & Mason 1975). Schodde (1982) noted that the species was restricted to the Arnhem Land sandstone plateau, but occurred there only in particularly suitable pockets and was "not widespread or very common anywhere". Collar & Andrew (1988) considered it "near-threatened", and Kennedy (1990) judged it "potentially vulnerable". Woinarski *et al.* (1989) included the White-throated Grasswren as one of a group of notable species in Stage III of Kakadu, a designation labelled "perplexing" by Holmes & Noske (1990).

In describing survey results which list several hundred species it is sensible to highlight some species which are most interesting, have special management requirements, or for which the area may have substantial conservation value. For managers of Stage III, and tourists who visit it, the White-throated Grasswren is notable because (i) it is one of only two bird species restricted to the Northern Territory, (ii) the most popular and accessible spot to see the species is in Stage III, and indeed this location (UDP Falls, now renamed Gunlom) is widely recognised and recorded as such in guidebooks (e.g. Bransbury 1987), (iii) Kakadu National Park is one of only two conservation reserves in which the species occurs, and the population in the other reserve (Nitmiluk) is not very accessible, poorly known, and probably much smaller, (iv) a substantial proportion of the population occurs in Kakadu National Park, and specifically in Stage III, (v) the White-throated Grasswren may be vulnerable to changes in fire regimes, and (vi) the total population size of this species may be small.

Instead, Noske (1988, 1990, 1992) and Holmes & Noske (1990) argue that this species is reasonably common, widespread and secure. Indeed, largely because of these claims, the status of this species was downgraded in the RAOU list of threatened birds of Australia to "species investigated but considered secure" (Brouwer & Garnett 1990). How can these disparate views be reconciled? Here I examine the results of Noske's (1988) reconnaissance survey (*sensu* Braithwaite 1985), and compare this with recent primary surveys of birds in the Kakadu area.

Assessment of Status from Reconnaissance Survey

In December 1987 and January 1988, Noske (1988) undertook an eight day field survey of White-throated Grasswrens aimed at searching for and censusing the species across its putative range. From this survey, he estimated the total population at between 30,000 and 100,000 birds, a range subsequently (Noske 1990, 1992) narrowed to "roughly between 50,000 and 60,000". This derivation was based on estimating densities in "suitable" habitat and then multiplying this density by the total area of that habitat. There are several caveats in this process, and how well these are considered will affect the reliability of the eventual total population estimate.

Counts and Population Density

White-throated Grasswrens are elusive and difficult to count in their rugged habitat. Noske's (1988) population survey involved brief visits, and his local population estimates are accordingly not derived from the usual census procedures of transects, quadrat counts or mark/recapture. The total counted was 46 birds spread over eight sites, a limited base from which to project entire population totals.

Noske (1988) gave a figure for the area of eight sites in which he recorded Grasswrens, although he didn't define how this area was measured. The density estimates for these sites are very variable (coefficient of variation = 122), which would limit the precision of any population projection. Average density was calculated by summing the total number of birds recorded and dividing this by the total area in which they occurred (in the process losing any possibility of assigning confidence limits to his estimates). Sites in which no birds were recorded despite searching in apparently suitable habitat (e.g. Diamond Creek) were excluded from this density calculation. This omission serves to inflate the population density estimate, by a factor which it is not possible to determine from the present data.

Suitable Range

Based on observations from the 11 known locations for this species, Noske (1988, 1992) considered that habitat suitability for this species is determined by vegetation characteristics (presence of spinifex) and topographic features (flat unbroken plateaus). He estimated the area of such suitable habitat from 1:100,000 topographic maps, as being 14,000 km². For most of this region, vegetation maps were not available at the time, so that one of the two key criteria of habitat suitability was apparently not considered in this estimate.

A check on the reliability of this estimate of extent of "suitable" habitat is available for Kakadu National Park, where a detailed habitat map (Schodde *et al.* 1987) portrays the distribution of sandstone spinifex. Noske (1988) estimated that about a quarter of the total Grasswren population occurs in Kakadu NP (implying that the area of suitable habitat there is 3,500 km²). In fact, the Schodde habitat map shows that only 660 km² of sandstone spinifex occurs in all of Kakadu (J. Tranter, ANPWS *pers. comm.*); that is, for the only area in which Noske's (1988) habitat prediction can be accurately assessed, that amount of "suitable" area is overestimated by a factor of more than five. But this area of sandstone spinifex may overestimate the extent of "suitable" habitat. Fire may render areas at least temporarily uninhabitable and may cause the elimination of some local populations. This means that much of the sandstone spinifex area may, at least temporarily, be unsuitable habitat for Grasswrens at any given time, and should not be included in the derivation of total population estimates. The very fragmented nature of the habitat (Woinarski & Braithwaite 1991) may also mean that many of the small and isolated patches may also be unlikely to hold Grasswrens.

Threats and population changes

There were no published population estimates or censuses prior to Noske's (1988) work, which makes any change in status difficult to detect. Both of the best known colonies appear to have declined during the last decade. At East Alligator, Ian Morris (in Noske 1988) reported "a dense population" of Grasswrens on several ridges and surrounding rocky outcrops in the 1970's. Noske located only three birds in this area in his detailed search in 1987. At UDP Falls (now renamed Gunlom), two of three Grasswren territories were severely burnt in 1987, with the results of eliminating their habitat there and consequent loss of birds.

Noske's (1988) data indicate some effects of fire. Of all his sites, two had been recently burnt by moderate intensity fires, whereas six had not been subject to recent (<1 year) burns. In the burnt sites, Grasswren density was 0.018 birds/ha (*s.d.* = 0.002); for the unburnt sites density averaged 0.085 birds/ha (*s.d.* = 0.086). Fire regime would appear to be an important factor in the ecology and survival of this species, as it is for other Grasswren species elsewhere (e.g. McKean & Martin 1989). Recent research is suggesting that the fire regime imposed upon the Arnhem Land massif is undergoing a marked and rapid change, with a decrease in small cool fires, and an increasing frequency of extensive very hot fires (Bowman *et al.* 1990; Bowman 1991; J. Russell-Smith *pers. comm.*). The resulting change in the scale of the mosaic would be expected to have profound consequences for all species of this habitat.

Refining the population estimates

Considering the above qualifications, Noske's counts suggest an estimate of total population of well less than 10,000 birds.

Another Approach: Quadrat Data from Kakadu

Recently we have completed a two year wildlife survey of Stage III of Kakadu National Park (c 6,700 km²), which includes much of the southwestern extent of the

Grasswren's range (Woinarski & Braithwaite 1991). This survey was not intended to provide a population estimate of any particular species, and more intensive such work in sandstone habitats would be required for a confident estimate of overall numbers of Grasswrens. However, the data do provide some assessment of abundance and distribution, and provide a rough check on Noske's (1988) estimate and the amended estimate provided above. Over this period, 370 1 ha marked quadrats, spread representatively over habitats and geographic areas, were sampled. For all of these quadrats, birds were censused in 10 instantaneous counts per quadrat, spaced over four days. White-throated Grasswrens were present in only one habitat, Sandstone Spinifex, of the 22 habitats present and sampled. Their mean density in this habitat was 0.04 birds/ha, clearly not a common bird even in this preferred habitat. Woinarski *et. al.* (1989b) also censused sandstone spinifex in five quadrats in Stage I of Kakadu, without recording Grasswrens. Combined, these results provide an estimated population density of 0.027 birds/ha, and hence a population estimate for Kakadu of 1781 birds. Accepting Noske's figure that Kakadu probably holds about one quarter of the entire population, this gives a total population estimate of 7,125 birds (with very broad 95% confidence limits of 0 to 20,749). This estimate excludes any consideration of habitat made temporarily unsuitable due to recent fire, so is probably an overestimate.

Conclusions

This case has intrinsic interest and real conservation management implications. It also provides an example for more general problems. Firstly, it shows that those judging conservation status for Top End animals unfortunately are forced to base that judgement on a remarkable dearth of detailed biological information. Secondly, it demonstrates the desirability of using standard and acceptable census procedures, the need to include measures of error or variability in population counts and projections, the danger of predicting total population levels from limited base line data, and the importance of recognising qualifications in the interpretation of these projections. Thirdly, it illustrates the limitations of the pigeon-holes of status assignment. It remains unclear whether a population of 5000 to 10,000 renders the White-throated Grasswren secure or insecure, though this population level is obviously more exposed than one of 50,000 to 60,000, especially given the possibility of vulnerability to changing fire regimes. Finally, it concerns the question of how prudent we should be in defining status. If there is some doubt about population numbers and extent of threats, this uncertainty should be explicitly recognised, and the case investigated further. The presumption of security in such unclear cases is not prudent.

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Do Grasswrens have the numbers? Reply to Woinarski (1992)

In attempting to reconcile the disparate views about the status of the White-throated Grasswren *Amytornis woodwardi*, Woinarski (1992) has presented a somewhat tendentious argument. Collar & Andrew (1988) and Kennedy (1990) may have considered the species "near-threatened" or "potentially vulnerable", but neither have studied the species, nor evidently examined my report; indeed their assessments were based on the advice of other biologists. The labelling of the species as "notable" by Woinarski *et. al.* (1989) was considered "perplexing" by Holmes & Noske (1990) because: (a) the work of Noske (1988) was cited, but its conclusions ignored; and (b) the term "notable" had the distinct connotation of rarity and / or endangered status (see Braithwaite & Woinarski (1990) and Woinarski & Braithwaite (1990)). It is noteworthy that three other species categorised as rare
